REMARKS

The final Office Action dated August 20, 2008 and the Advisory Action dated November 21, 2008 have been received and carefully noted. The above amendments to the claims, the following remarks, and the enclosed Request for Continued Examination (RCE) are submitted as a full and complete response thereto.

Claims 1, 10, 25, and 28 have been amended to more particularly point out and distinctly claim the subject matter of the invention. No new matter has been added. The claim amendments included herein assume entry of the previous amendments filed on October 20, 2008, as the Advisory Action of November 21, 2008 did not indicate that the claim amendments were not entered. Therefore, Applicants respectfully request entry and consideration of the amendments and arguments filed on October 20, 2008, as well as the amendments and arguments submitted herewith.

Claims 1-2, 5-11, 14-25, and 27-28 are currently pending in the application and respectfully submitted for reconsideration.

Rejections under 35 U.S.C. §112

The final Office Action rejected claim 28 under 35 U.S.C. §112, second paragraph, as being allegedly indefinite because the claim is directed to a system with coverage and capacity layers but does not recite any elements components for achieving the layers. The Advisory Action maintained this rejection and indicated that the

recitation of "coverage layer carriers" is a non-physical element (Advisory Action, page 2). Applicants submit that this rejection is rendered moot for the following reasons.

Claim 28 has been amended to recite "a station configured to" provide a coverage layer and a capacity layer, and to vary the number of carriers in the capacity layer. Applicants submit that "a station" is clearly a structural component which thereby renders claim 28 definite. Accordingly, Applicants submit that this rejection is moot and should be withdrawn.

The final Office Action also rejected claims 1-28 under 35 U.S.C. §112, first paragraph, because the limitation of "varying the total capacity" is allegedly not disclosed in the specification to enable on of ordinary skill in the field of communication to implement these claims. Applicants note that claims 3-4 and 12-13 were previously cancelled. Applicants respectfully traverse the rejection of the remaining claims because they are fully supported by the specification.

As an initial matter, Applicants note that claim 1 has been amended to recite "wherein the defining unit is configured to vary the number of carriers in the capacity layer." Claim 10 has been amended to recite "varying, by the station, the number of carriers in the capacity layer." As mentioned above, claim 28 has been amended to recite "a station configured to" vary the number of carriers in the capacity layer.

For example, paragraph 0027 of the present specification states that carriers can be added or removed from the cell, thereby varying the capacity of the cell. Paragraph 0031 of the specification provides that "the coverage of certain carriers may be limited, in

order to accommodate more carriers in the network." Paragraph 0033 of the specification describes that the capacity of the cell can be dynamically adjusted, and paragraph 0034 provides that the CCR parameters can be easily mapped to a table which can be utilized dynamically for the network. Paragraph 0036 of the present specification states that the third column of the table lists the total capacity, *i.e.*, the number of carriers in the cell for various arrangements. Paragraph 0063 further provides that the multicarrier system can dynamically change the number of carriers. Paragraph 0078 states that the radio resource management can dynamically change the CCR parameters of the cell.

Therefore, Applicants respectfully assert that the specification provides ample support for the varying the total capacity by varying the number carriers in a cell. It would be clear to a person of ordinary skill in the relevant art, in view of the disclosure provided by the specification, that various recited embodiments of the present invention allow for the total capacity of the cell to be dynamically varied. Accordingly, Applicants respectfully request that the rejection of the claims under 35 U.S.C. §112, first paragraph, be withdrawn.

Rejections under 35 U.S.C. §103(a)

The final Office Action rejected claims 1-2, 5-11, 14-21, and 23-28 were rejected under 35 U.S.C. §103(a) as being allegedly obvious over U.S. Patent No. 6,128,328 ("Schilling") in view of U.S. Patent No. 5,889,494 ("Reudink"). Referring, for example, to claim 1, the Office Action asserted that Schilling discloses all of the elements of the

claim, with the exception of the number of carriers in the capacity layer being variable. The Office Action then cited Reudink as allegedly curing this deficiency in Schilling. The Advisory Action maintained this rejection and provided a "Response to Arguments" addressing Applicants' arguments as submitted in the Response of October 20, 2008. Applicants submit that the present claims recite subject matter which is neither disclosed nor suggested by the combination of Schilling and Reudink, and Applicants provide the following arguments in support thereof and a response to the issues raised by the Office Action and Advisory Action.

Claim 1, upon which claims 2, 5-9, and 23 are dependent, recites an apparatus comprising a defining unit. The defining unit is configured to define a capacity layer for a cell of a communications system. The cell includes a coverage layer having a fixed coverage area provided by at least one carrier, and the capacity layer includes at least one carrier. Each carrier in the capacity layer has a dynamically variable coverage area. The defining unit is configured to vary the number of carriers in the capacity layer, to thereby dynamically vary the total capacity of the cell.

Claim 10, upon which claims 11, 14-18, and 24 are dependent, recites a method that includes defining, by a station, a capacity layer for a cell of a communications system. This cell includes a coverage layer having a fixed coverage area provided by at least one carrier, and the capacity layer includes at least one carrier. Each carrier in the capacity layer has a dynamically variable coverage area. The method further includes

varying, by the station, the number of carriers in the capacity layer, to thereby dynamically vary the total capacity of the cell.

Claim 19, upon which claims 20-22 are dependent, recites an apparatus that includes at least one transmitter configured to transmit a first carrier at a predetermined power level. The transmitter thereby defines a fixed coverage area of a cell of a communications system. The transmitter is configured to transmit a variable number of further carriers thereby defining, at least in part, a dynamically variable total capacity of the cell, such that each of the further carriers has a dynamically variable coverage area.

Claim 25 recites an apparatus that includes means for defining a capacity layer for a cell of a communications system, the cell comprising a coverage layer having a fixed coverage area provided by at least one carrier, the capacity layer comprising at least one carrier. Each carrier in the capacity layer has a dynamically variable coverage area. The apparatus further includes means for varying the number of carriers in the capacity layer, to thereby dynamically vary the total capacity of the cell.

Claim 27 recites an apparatus that includes means for transmitting a first carrier at a predetermined power level thereby defining a fixed coverage area of a cell of a communications system. The apparatus also includes means for transmitting a variable number of further carriers, thereby defining, at least in part, a dynamically variable total capacity of the cell, wherein each of the further carriers has a dynamically variable coverage area.

Claim 28 recites a cellular communication system including at least one cell. The cell includes a station configured to provide a coverage layer having a fixed coverage area. The station is also configured to provide a capacity layer comprising at least one carrier, the at least one carrier having a dynamically variable coverage area. The station is further configured to vary the number of carriers in the capacity layer to thereby dynamically vary the total capacity of the cell.

Certain embodiments of the present invention provide significant technical benefits and are particularly useful in TDMA systems, such as that described in the present application. The number of carriers in each cell can be dynamically varied so that at times when a large number of users wish to communicate with the base station, the number of carriers in the cell can be increased to accommodate the extra demand. However, at times when only a small number of users wish to communicate with the base station, the number of carriers in the cell can be reduced to decrease the power consumption in the cell and also the interference between cells. Hence, by dynamically varying the total capacity of the cell, the system can adapt to the current requirements of the system and therefore optimize the system. As described, for example, in paragraph 0112 of the specification this can lead to a cheaper radio network, no waste of resources, and efficient spectrum utilization.

As will be discussed below, the combination of Schilling and Reudink fails to disclose or suggest all of the elements of the claims, and therefore fails to provide the advantages and features discussed above.

Schilling discloses a CDMA cellular communication system including at least one cell. Each cell is split up into a number of different regions. Each region is assigned a frequency range (F1-F6) that is different to the frequency range assigned to its adjacent regions (See Schilling, Figures 5 and 8). Each frequency range can accommodate a certain number of remote units communicating with the base station in the CDMA system. For example in column 12, lines 59 to 64, Schilling states that each frequency range could accommodate 80 remote units. If the number of units in a region exceeds 80, and the number of units in an adjacent region is below 80 then the region size should be adjustable to meet the demand.

Reudink discloses a system for dynamically sizing sectors of a multi-sectored radiation pattern. Multiple narrow beams are used and the number of narrow beam signals provided to inputs associated with a particular sector defines the azimuthal width of that sector. Thus, Reudink discloses dynamically shaping the cell through beam forming of the antenna pattern at each cell.

Applicants respectfully submit that Schilling and Reudink, whether considered individually or combined, fail to disclose or suggest all of the elements of the present claims. Applicants respectfully submit that Schilling and Reudink do not disclose or suggest "each carrier in the capacity layer having a dynamically variable coverage area, wherein the defining unit is configured to vary the number of carriers in the capacity layer, to thereby dynamically vary a total capacity of the cell," as recited in claim 1 and the similar limitations recited in claims 10, 25 and 28. Similarly, the combination of

Schilling and Reudink fails to disclose or suggest transmitting "a variable number of further carriers thereby defining, at least in part, a dynamically variable total capacity of the cell, wherein each of the further carriers has a dynamically variable coverage area," as recited in claim 19 and similarly recited in claim 27.

Schilling discloses changing the area covered by one cell with the idea to adjust the collected traffic to the capacity of the base station. Thus, the traffic is spread evenly over the cells. In this way, the disclosure in Schilling relates to a type of shunting of subscribers from one cell to a neighboring cell. As a result, Schilling relates to dealing with how to collect user traffic effectively.

As discussed above, Schilling discloses a CDMA cellular communication system including at least one cell. *See, for example*, elements A, B, C, in Figure 5. Each cell is split up into a number of different regions. Each region is assigned a frequency range (F1-F6) that is different to the frequency range assigned to its adjacent regions (See Figures 5 and 8). Each frequency range can accommodate a certain number of remote units communicating with the base station in the CDMA system. For example in column 12, lines 59 to 64, it states that each frequency range could accommodate 80 remote units. If the number of units in a region exceeds 80, and the number of units in an adjacent region is below 80 then the region size should be adjustable to meet the demand.

Although each region in Schilling may adjust its size, Schilling discloses that the number of regions and the **total capacity of each region is fixed**. Therefore, the capacity of each cell is fixed (i.e. the number of remote users that can be accommodated

in each cell cannot vary). There is nothing in Schilling to suggest that the capacity of the cell could vary. As such, Schilling does not disclose that the total capacity of the cell is dynamically varied, as recited in the present claims.

In the Advisory Action (page 2, paragraph 2) it is alleged that the capacity of a cell can be increased (and therefore varied) in the system of Schilling. In fact, the part of the document referred to by the Advisory Action states that the capacity of the system can be varied. It does not follow, however, that the total capacity of a cell can be dynamically varied as recited in the independent claims of the present application.

Column 11 of Schilling explains that the capacity of the entire system shown in figure 8 can be increased if all the like-referenced sectors contain the same frequencies. This has no bearing on cell capacity. Additionally, Schilling provides no disclosure of dynamic variation of capacity. Rather, the system of Schilling aims to provide a fixed and even capacity to each sector, as explained in Column 10, lines 19-27 of Schilling.

The Advisory Action further suggests that, because the Schilling system uses frequency hopping, the cell capacity is inevitably varied (Advisory Action, page 2, paragraph 3). Applicants respectfully disagree with this assertion. The ability to frequency-hop in Schilling is within a fixed set of frequencies in each sector (see Schilling, final paragraph of column 8). Thus, the number of carriers in each sector cannot be varied and, therefore, the number of carriers in the cell cannot be varied. Hence, the capacity cannot be varied in the manner recited in the present claims.

The Advisory Action further addresses Applicants' arguments previously made regarding user capacity in Schilling (Advisory Action, page 2, paragraph 4). The Advisory Action states "the controller can utilize a variable number of frequencies to accommodate up to 80 users" and that this "means the controller has a varying capacity by using a varying number of carriers" (Advisory Action, page 2). Applicants respectfully submit that this reasoning is incorrect. First, just because the controller is not necessarily using all frequencies in a set at any one time, it does not follow that the controller of Schilling is configured to vary the number of carriers. The number of carriers is still fixed as per the allocated frequency set. Second, in contrast to what the Advisory Action appears to be suggesting, the system as explained in column 12 of Schilling does not disclose varying the number of carriers, either down or up. Rather, Schilling merely discloses handoff to another sector in the event of overload. In other words, merely because there is a maximum number of carriers does not mean that the number of carriers is changeable. Indeed there is no disclosure of the number of carriers being reduced as implied by the Office Action and Advisory Action, because the number is fixed in each sector and therefore in the cell.

Continuing to page 3, the Advisory Action refers to a textbook relating to CDMA systems. The information cited from this textbook notes that system capacity can be increased but states that system performance is consequently degraded. Therefore, Applicants submit that this information actually teaches away from the number of carriers being increased as recited in the present claims.

Further, the final Office Action referred to Schilling at column 12, lines 58 to 65, which states that "for example, in Fig 6, a maximum of 80 remote units can be accommodated per sector. If 81 remote units appear in a sector and only, say, 75 remote units appear in an adjacent sector, the sector size should be adjustable to meet the demand." Applicants note that this section of Schilling describes that the size of the sectors making up the cell can be adjusted but not the number of sectors or the maximum number of remote units per sector. In the example described in column 12, lines 58 to 65 of Schilling, the maximum number of remote units that can be accommodated in each sector is 80. The number of sectors in the example of Fig 6 of Schilling is 6. Therefore, the total capacity of the cell is 80*6 = 480 remote units. This total capacity is not dynamically varied in Schilling, and the adjusting the sector size does not adjust the total capacity which is fixed (at 480 remote units in the example described in Schilling on column 12, lines 58 to 65). It is therefore submitted that, contrary to the technical arguments in Office Action, Schilling does not disclose the feature dynamically varying the total capacity of the cell as recited in the present claims.

Therefore, Applicants respectfully submit that Schilling does not disclose or suggest "each carrier in the capacity layer having a dynamically variable coverage area, wherein the defining unit is configured to vary the number of carriers in the capacity layer, to thereby dynamically vary a total capacity of the cell," as recited in claim 1 and the similar limitations recited in claims 10, 25 and 28. Similarly, Schilling fails to disclose or suggest transmitting "a variable number of further carriers thereby defining, at

least in part, a dynamically variable total capacity of the cell, wherein each of the further carriers has a dynamically variable coverage area," as recited in claim 19 and similarly recited in claim 27.

In addition, Reudink fails to cure the various deficiencies in Schilling outlined above. Instead, as discussed above, Reudink discloses a system for dynamically sizing sectors of a multi-sectored radiation pattern. Multiple narrow beams are used and the number of narrow beam signals provided to inputs associated with a particular sector defines the azimuthal width of that sector. Thus, Reudink discloses dynamically shaping the cell through beam forming of the antenna pattern at each cell. In this way, Reudink also relates to collecting user traffic more effectively.

Reudink, like Schilling, does not disclose or suggest "each carrier in the capacity layer having a dynamically variable coverage area, wherein the defining unit is configured to vary the number of carriers in the capacity layer, to thereby dynamically vary a total capacity of the cell," as recited in claim 1 and the similar limitations recited in claims 10, 25 and 28; and, similarly, Reudink fails to disclose or suggest transmitting "a variable number of further carriers thereby defining, at least in part, a dynamically variable total capacity of the cell, wherein each of the further carriers has a dynamically variable coverage area," as recited in claim 19 and similarly recited in claim 27.

The Office Action refers to Column 11, lines 23 to 38 of Reudink in an attempt to show the feature of varying "the number of carriers in the capacity layer." However, Applicants assert that this section of Reudink merely states "sector controller 460 may

adjust the splitter/switch matrixes of the present invention to provide alternative sector sizing and thus increase the number of channels, or other resources, available to a particular area within the cell, or improve signal quality associated with a sector or user" (Reudink, Column 11, lines 23 to 38). When more channels are provided to a particular area within a cell, these channels must be taken away from another area that has less user demand. The total number of channels within the cell is fixed, and in the examples given in Reudink, the total number of channels within a cell is fixed at 12.

Even if the cell 201 of Figure 2 of Reudink is considered to be a recited "cell" as recited in the present claims (not admitted), Applicants note that the coverage area of this cell is fixed, and that the number of carriers in the cell and, therefore, the total capacity of the cell are also fixed. Alternatively, if a sector of a cell such as 151 in Figure 1B could be considered a "cell" as recited in the present claims (also not admitted), Applicants further note that the coverage area varies and the capacity of the "cell" varies as the number of narrow beams in the sector is changed, and this disclosure in Reudink teaches away from the express recitations of the present claims. Specifically, neither of these interpretations of Reudink, nor any proper reading of the reference, include the recited combination of features of embodiments of the present application in which the coverage area of the cell is fixed and the number of carriers in the capacity layer is variable to thereby dynamically vary the total capacity of the cell, as recited in the present claims.

As described above, a number of narrow beam antennae are used in Reudink to provide dynamically shapable sectors within a cell. The narrow beams shown for

example in Figure 2 are combined in different configurations to provide different configurations for the sectoring within the cell. For example, as depicted in Reudink at Figures 3A and 3B, two adjacent 60° sectors are provided such that two sectors are provided over 120°. This leaves one sector to cover the remaining 240° of the cell (Reudink at column 8, lines 40 to 66). In this way, the disclosure in Reudink can be used to dynamically distribute capacity within the cell, but the total capacity of the cell is fixed. Thus, Reudink teaches away from varying the total capacity of the cell, stating in column 2, lines 42 to 48 that "it would be advantageous to make more efficient use of cellular capacity by being able to make sectors dynamically shapable in order to provide increased capacity to a particular area within the cell's radiation pattern by making more channels potentially available to that particular area, without actually increasing the total number of channels within the cell."

Accordingly, it appears that the Office Action and Advisory Action have misunderstood Reudink and the fact that Reudink does not disclose the ability to vary the total capacity of the cell. Reudink does allow variation of sector size but this has no bearing on total cell capacity as required by the claims. Accordingly, Reudink does not cure the deficiencies in Schilling.

For at least the reasons discussed above, Applicants respectfully submit that Schilling and Reudink do not disclose or suggest "each carrier in the capacity layer having a dynamically variable coverage area, wherein the defining unit is configured to vary the number of carriers in the capacity layer, to thereby dynamically vary a total

capacity of the cell," as recited in claim 1 and the similar limitations recited in claims 10, 25 and 28. Similarly, the combination of Schilling and Reudink fails to disclose or suggest transmitting "a variable number of further carriers thereby defining, at least in part, a dynamically variable total capacity of the cell, wherein each of the further carriers has a dynamically variable coverage area," as recited in claim 19 and similarly recited in claim 27. Applicants therefore respectfully request that the rejections of claims 1, 10, 19, 25, 27, and 28 be withdrawn.

Applicants further urge that the combination of Schilling and Reudink is legally improper under 35 U.S.C. §103(a). As depicted in Figures 5 and 8, Schilling discloses how a cell is split up into concentric regions in which distinct frequencies can be used. For example, Figure 8 of Schilling discloses that the sectors are arranged in a specific order to minimize the interference of adjacent cells. Adding a new carrier at a new frequency (*see, e.g.*, F7 in the terminology used in Figure 8 of Schilling) would disrupt the entire system, and Schilling contains no disclosure or suggestion regarding how the sectors of Figure 8 would accommodate this extra frequency. that it would not be obvious to the skilled person how to modify the sector arrangement shown in Figure 8 of Schilling to include such a feature. Therefore, Schilling could not be combined with any document to disclose the features of the claimed invention without significant additional development and undue experimentation.

Moreover, Reudink discloses equally spaced radial narrow beams are used (Figure 2) and these narrow beams are grouped to form radial sectors within the cells. Thus, the

two cited references provide alternative, technically incompatible ways of splitting up the cells into sectors. These two cell division cannot be combined because the technical techniques are adverse, and there would be no reasonable expectation for technical success of the combination. Therefore, this combination is legally improper. *See*, MPEP §2143. Withdrawal of this rejection under 35 U.S.C. 103(a) is also respectfully requested on this legal ground.

Claims 2, 5-9, 11, 14-18, and 20-24 are dependent upon claims 1, 10, and 19, respectively. As such, claims 2, 5-9, 11, 14-18, and 20-24 should be allowed for at least their dependence upon claims 1, 10, and 19, and for the specific limitations recited therein.

Claim 22 was rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Schilling and Reudink, in view of U.S. Patent Publication No. 2004/0203837 ("Lawrence"). The Office Action took the position that Schilling and Reudink disclose all of the features of claim 22, with the exception of at least one transmitting unit is further configured to reduce power allocated to at least one carrier in response to an increase in the variable number of carriers. The Office Action then cited Lawrence as allegedly curing this deficiency in Schilling and Reudink. Applicants respectfully submit that the cited references, taken individually or in combination, fail to disclose or suggest all of the features recited in claim 22.

Schilling and Reudink are outlined above. Lawrence is directed to managing system control signaling to optimize spectrum and other system resources. Lawrence

describes making available the spectrum normally occupied by the control channel to service channels (voice or data channels) when the control channel has no further service channels to assign (i.e., all service channels are active). The capability for a control channel radio is defined for operating on a center frequency, assigning traffic to a second radio, supporting the delivery of voice and data, and operating on the same center frequency.

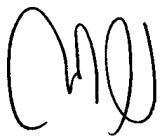
Claim 22 is dependent upon claim 19. As discussed above, Schilling and Reudink fail to disclose or suggest all of the elements of claim 19. Additionally, Applicants respectfully submit that Lawrence, like Schilling and Reudink, also fails to disclose varying the number of carriers in the capacity layer to dynamically vary the capacity of the cell. Thus, Lawrence fails to cure the deficiencies in Schilling and Reudink. Applicants submit therefore that the combination of Schilling, Reudink, and Lawrence fails to disclose or suggest all of the elements of claim 22. In addition, claim 22 should be allowed for at least its dependence upon claim 19, and for the specific limitations recited therein.

Applicants respectfully submit that Schilling, Reudink, and Lawrence, whether viewed individually or combined, fail to disclose or suggest all of the elements of the claimed invention. These distinctions are more than sufficient to render the claimed invention unanticipated and unobvious. It is therefore respectfully requested that all of claims 1-2, 5-11, 14-25, and 27-28 be allowed, and this application passed to issue.

If for any reason the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, the applicant's undersigned representative at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

In the event this paper is not being timely filed, the applicant respectfully petitions for an appropriate extension of time. Any fees for such an extension together with any additional fees may be charged to Counsel's Deposit Account 50-2222.

Respectfully submitted,



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Petition for Extensions of Time